-----Forwarded Message-----
From: Steven Ventresca
Sent: Jun 8, 2015 7:03 AM
To: "Steve Hinton (shinton@mindspring.com)"
Cc: 'Marty Galligan'
Subject: Long Ridge Nitrogen Loading Memo

Steve,

I revised the original Long Ridge Memo to include two other scenarios for nitrogen loading. Option 1 is the original proposed project. Option 2 takes a bedroom out of the 4 bedroom unit (existing house) and Option 3 takes a bedroom out of the three bedroom unit. Based on the numbers, Brem would need to remove one (1) two bedroom unit from the project to meet the nitrogen loading for the site based on 8.92 available acres.

I am in and out of the office today but will be checking e-mails periodically.

Steve

Steven Ventresca, PE, LEED AP BD+C | Project Manager

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MEMORANDUM

TO: Carlisle Zoning Board of Appeals

FROM: Steven Ventresca, PE, Nitsch Engineering

DATE: June 8, 2015

RE: Aggregation of Flows and Nitrogen Loading
100 Long Ridge Road ("The Birches")
Comprehensive Permit – 40B

The purpose of this memo is to review the Aggregation of Flows and Nitrogen Loading for the Long Ridge Road project in Carlisle, Massachusetts. Nitsch Engineering used the following information for calculating the nitrogen loading for the site:

1. Department of Environmental Protection's "Guidelines For Title 5 Aggregation of Flows and Nitrogen Loading, revised February 11, 2015;
2. 310 CMR 15 – The State Environmental Code Title 5;
3. A plan entitled, "The Birches – 100 Long Ridge Road, Carlisle, MA" prepared by Meisner Brem Corporation revised March 27, 2015 (Sheet 5 of 11); and
4. A Memo "RE: The Birches – Application for Comprehensive Permit," dated May 13, 2015.

Nitsch Engineering used the above information to determine the proposed nitrogen loading for the project and the required land area using the allowable flows under Title 5 for enhanced nitrogen removal.

The Applicant indicates that there is approximately 9.34 acres (ac) of land to meet the nitrogen loading equivalency requirements for the project.

Title 5 allows 440 gallons per day (gpd) of sewage flow for a Department of Environmental Protection (DEP) acre of land in a nitrogen sensitive area. Title 5 defines an "acre" of land as 40,000 square feet. A correction of 0.91 is multiplied by the calculated total area to arrive at the adjusted area for nitrogen loading for the site (40,000 square feet per DEP acre / 43,560 square feet per acre = 0.91).

DEP will allow either 550 gpd or up to 660 gpd for septic systems using Innovative / Alternative (I/A) technologies approved by the State.

Nitsch Engineering offers the following calculations for the land required to meet the nitrogen loading equivalency requirements for the Long Ridge Road project based on the number of bedrooms proposed by the Applicant. Nitsch Engineering prepared the following three (3) scenarios for nitrogen loading equivalency requirements based on the latest project information provided by the Applicant:

- Option 1 is the currently proposed Long Ridge Project;
- Option 2 is if the Applicant removes a bedroom from the four (4) bedroom unit with the 440 gpd equivalency; and
- Option 3 is if the Applicant removes a bedroom from one of the other proposed units with the 660 gpd equivalency.

Option 1 – Proposed Project

Required Land Area Calculation

# of Bedrooms	# of Units	Flow, (110 gallons per day per bedroom)	Acre Equivalency*= Title 5 Flow / Allowed Flow with I/A
2	2	440 gpd	440 gpd / 660 gpd/ac = *0.67 acres*
3	17	5610 gpd	5610 gpd/ 660 gpd/ac = *8.50 acres*
4	1	440 gpd	440 gpd / 440 gpd/ac = *1.00 acres*
			10.17 acres (total area)
			Adjusted Area (10.17 ac x 0.91) 9.25 AC

*660 GPD/AC allowable for Enhanced Nitrogen Removal – Applied for proposed septic systems

9.25 acres are required to meet the equivalency standard for nitrogen removal.

Nitsch Engineering calculated the required project area to meet the nitrogen loading equivalent:

Land Area Required

Total Site Area = 9.84 acres
Proposed Roadway Area = - 0.92 acres (includes roadway, driveway, and parking spaces)

Site Area towards Credit = 8.92 AC < 9.25 AC → Proposed Project Area is less than the Required Area

The DEP Guidance states that the road area cannot be used for the nitrogen credit and must be removed from the required land area calculation.

Based on the information provided by the Applicant and using the Guidelines for Title 5 Aggregation, it appears that the project does not meet the enhanced nitrogen removal requirements after the proposed roadway area is removed from the total site area calculation. Nitsch Engineering recommends that the Applicant provide revised calculations that indicate that the nitrogen requirement is met for the project.

Option 2 – Remove one (1) bedroom from the four (4) bedroom unit

Required Land Area Calculation

# of Bedrooms	# of Units	Flow, (110 gallons per day per bedroom)	Acre Equivalency*= Title 5 Flow / Allowed Flow with I/A
2	2	440 gpd	440 gpd / 660 gpd/ac = *0.67 acres*
3	17	5610 gpd	5610 gpd/ 660 gpd/ac = *8.50 acres*
3	1	**330 gpd**	**330 gpd** / 440 gpd/ac = ***0.75 acres***
			9.92 acres (total area)
			Adjusted Area (9.92 ac x 0.91) 9.03 AC

*660 GPD/AC allowable for Enhanced Nitrogen Removal – Applied for proposed septic systems

9.03 acres are required to meet the equivalency standard for nitrogen removal.

Nitsch Engineering calculated the required project area to meet the nitrogen loading equivalent:

Land Area Required

Total Site Area = 9.84 acres
Proposed Roadway Area = - 0.92 acres (includes roadway, driveway, and parking spaces)

Site Area towards Credit = 8.92 AC < 9.03 AC → Proposed Project Area is less than the Required Area

The DEP Guidance states that the road area cannot be used for the nitrogen credit and must be removed from the required land area calculation.

Based on the information provided by the Applicant and using the Guidelines for Title 5 Aggregation, it appears that the project would not meet the enhanced nitrogen removal requirements after the proposed roadway area is removed from the total site area calculation and one (1) bedroom is removed from the four bedroom unit. Nitsch Engineering recommends that the Applicant provide revised calculations that indicate that the nitrogen requirement is met for the project.

Option 3 – Remove one (1) bedroom from one (1) three bedroom unit

Required Land Area Calculation

# of Bedrooms	# of Units	Flow, (110 gallons per day per bedroom)	Acre Equivalency*= Title 5 Flow / Allowed Flow with I/A
2	**3**	**660 gpd**	**660 gpd** / 660 gpd/ac = ***1.00 acres***
3	**16**	**5280 gpd**	**5280 gpd**/ 660 gpd/ac = ***8.00 acres***
4	1	440 gpd	440 gpd / 440 gpd/ac = *1.00 acres*
			10.00 acres (total area)
			Adjusted Area (10.00 ac x 0.91) **9.10 AC**

*660 GPD/AC allowable for Enhanced Nitrogen Removal – Applied for proposed septic systems

9.10 acres are required to meet the equivalency standard for nitrogen removal.

Nitsch Engineering calculated the required project area to meet the nitrogen loading equivalent:

Land Area Required

Total Site Area = 9.84 acres
Proposed Roadway Area = - 0.92 acres (includes roadway, driveway, and parking spaces)

Site Area towards Credit = 8.92 AC < 9.10 AC → Proposed Project Area is less than the Required Area

The DEP Guidance states that the road area cannot be used for the nitrogen credit and must be removed from the required land area calculation.

Based on the information provided by the Applicant and using the Guidelines for Title 5 Aggregation, it appears that the project does not meet the enhanced nitrogen removal requirements after the proposed roadway area is removed from the total site area calculation and one bedroom is removed from one of the proposed units. Nitsch Engineering recommends that the Applicant provide revised calculations that indicate that the nitrogen requirement is met for the project.